

CALL HANDLER INTERFACE WITH PERSONAL RESPONSE FEATURES AND ASSOCIATED METHOD

Field of the Invention

The present invention relates to the field of computers and telephony, and more particularly, to a call handler or other call operator interface.

5

Background of the Invention

A significant advance in telephony systems is disclosed, for example, in U.S. Patent Nos. 4,623,761; 4,697,282; 4,734,930 and RE 35,758 assigned to the present assignee, and which are incorporated herein by reference in their entirety. These patents disclose a personalized message storage and retrieval system capable of presenting to the caller played-back, previously recorded response messages perceived to be in the actual voice of the call handler on duty at the time. The call handler is also able to follow-up the played back, previously recorded response message with a conversation with the caller, without the caller detecting a change in the characteristics of the call handler's perceived voice.

20 The personalized message storage and retrieval system employs a voice synthesizer coupled between a response message memory and an audio interface to the call handler's headset. After the

storage of a series of response messages prepared by the call handler, the system is ready for use in answering incoming calls. In this playback mode, as incoming calls are monitored, the appropriate call 5 handler's voice enunciated response message is accessed from memory and, via the voice synthesizer and the audio interface, that message is played back to the caller.

Throughout the call, the call handler, who is 10 on line the entire time has been relieved of the need to actually recite the response phrase, and can now proceed to converse with the caller. Of course, the call handler can interact spontaneously with the caller, as well. The audio interface contains a level 15 control circuit which ensures that there is effectively no difference in the recorded voice played back to the caller and the "live" voice spoken by the call handler. As a result, the personalized message storage and retrieval system is listener transparent.

20 The personalized message storage and retrieval system, when combined with the call handler's headset in a typical installation, includes a number of individual components. For example, if the microphone in the call handler's headset is a high impedance 25 microphone, then a separate amplifier is required. This amplifier is typically carried by the call handler's headset, i.e., in the cord connected thereto. Accordingly, the call handler's position may suffer from a certain degree of clutter, especially in view of 30 the cables between components.

Summary of the Invention

In view of the foregoing background, it is therefore an object of the present invention to provide a call handler interface and an associated method which

reduces the number of discrete components or units, and which may also provide a lower cost.

This and other objects, features and advantages in accordance with the present invention are 5 provided by a call handler interface comprising a housing, a telephone line port carried by the housing to be connected to a telephone line, and a telephone headset port carried by the housing to be connected to a telephone headset.

10 The call handler interface preferably includes an amplifier carried by the housing and connectable between the telephone line headset port and the telephone headset port for amplifying and coupling signals therebetween. Personalized message storage and 15 retrieval circuitry is also preferably carried by the housing and connected to the amplifier for permitting a call handler to store at least one message in a voice of the call handler and selectively retrieve the stored personalized message for playing to a caller on the 20 telephone line.

The call handler interface advantageously allows the number of discrete system components to be reduced. In addition, since the circuitry can share portions, such as power supplies, amplifiers, etc., the 25 call handler interface can be less expensive than the total cost of multiple corresponding discrete components. Moreover, the lower cost call handler interface can be used in many applications, such as conventional receptionist applications where phrases, 30 such as a company's or firm's name, for example, are necessarily repeated many times throughout the day.

The call handler interface may further include at least one call handler interface switch carried by the housing, and control logic circuitry 35 carried by the housing for controlling the personalized

message storage and retrieval circuitry based upon the at least one call handler interface switch. The at least one call handler interface switch may further include a first set of function switches, and a second 5 set of personalized message selection switches.

Respective function indicators may be carried by the housing and associated with the first set of function switches.

The call handler interface may also include a 10 level control circuit carried by the housing that is connected to the amplifier for controlling at least a playback level for a personalized message. Accordingly, the caller is not aware that a prerecorded message is being played.

15 An external control port may be carried by the housing and is connected to the control logic circuitry for permitting external control of the personalized message storage and retrieval circuitry. A handset port may also be carried by the housing and 20 connectable to the amplifier for permitting connection of a telephone handset thereto. Consequently, at least one selector switch may be carried by the housing for selectively connecting the telephone headset port or the telephone handset port to the amplifier.

25 In one embodiment, the personalized message storage and retrieval circuitry preferably comprises a connector and a memory device removably mated with the connector. The memory device is for storing the at least one message in a voice of the call handler. The 30 memory device may be a card or memory stick, for example, that is carried by the particular call handler for use at any given call handler position.

The telephone line input port and/or the telephone line headset port may be wireless.

35 Alternatively, the telephone line input port and/or the

telephone line headset port may comprise a connector. In some embodiments the headset may be separate and in others embodiments the headset is carried by the housing.

5 Another aspect of the present invention relates to an automated call distribution (ACD) system comprising an ACD device and a plurality of call handler work stations connected thereto. Each work station preferably comprises a call handler display for 10 displaying information to a call handler, a call handler input device for accepting call handler inputs, and a call handler interface as described above.

15 Yet another aspect of the present invention relates to a telephone system comprising at least one key telephone set and at least one call handler interface connected thereto, with the call handler interface as described above. The at least one key telephone set may also be connected to a private branch exchange.

20 A further aspect of the present invention relates to a method for making a call handler interface. The method may comprise providing a housing with a telephone line port and telephone headset port carried by the housing, and providing an amplifier in 25 the housing that is connectable between the telephone line headset port and the telephone headset port for amplifying and coupling signals therebetween. The method may also include providing personalized message storage and retrieval circuitry carried by the housing 30 that is connected to the amplifier for permitting a call handler to store at least one message in a voice of the call handler and selectively retrieve the stored at least one personalized message for playing to a caller on the telephone line.

Brief Description of the Drawings

FIG. 1 is a schematic block diagram of an automated call distribution (ACD) system including a call handler interface in accordance with the present 5 invention.

FIGS. 2 and 3 are schematic block diagrams of different embodiments of a telephone system including the call handler interface in accordance with the present invention.

10 FIG. 4 is a more detailed block diagram of the call handler interface in accordance with the present invention.

FIG. 5 is a top plan view of the call handler interface for illustrating various function and control 15 switches in accordance with the present invention.

FIG. 6 is a more detailed block diagram of an alternate embodiment of the call handler interface in accordance with the present invention.

Detailed Description of the Preferred Embodiments

20 The present invention will now be described more fully hereinafter with reference to the accompanying drawings in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be 25 construed as limited to the illustrated embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements 30 throughout. Prime notation is used in alternate embodiments to indicate similar elements.

Referring initially to FIG. 1, an automated call distribution (ACD) system 10 comprising an ACD device 12 and a plurality of call handler work stations

14a-14n connected thereto is now described. The ACD system **10** includes a call handler interface **16** in accordance with the present invention. Each call handler work station **14a-14n** includes a computer **16**, 5 and a telephone headset **18** for the call handler's use. The ACD system **10** is also connected to the public switched telephone network (PSTN) **20** as will be appreciated by those skilled in the art.

As will be described in greater detail below, 10 the call handler interface **16** advantageously contains both personalized message storage and retrieval circuitry and an amplifier for the telephone headset **18**. As discussed above, such circuitry in the past was typically provided in completely separate components. 15 For example, if the microphone in the call handler's headset **18** is a high impedance microphone, then a separate amplifier would be required. This amplifier is typically carried by the call handler's headset **18**, i.e., in the cord connected thereto. The call handler 20 interface **16** in accordance with the present invention thus advantageously allows the number of discrete system components to be reduced. Accordingly, a call handler can experience less clutter in their working environment.

25 As will also be described in greater detail below, the personalized message storage and retrieval circuitry permits a call handler to store at least one message in a voice of the call handler and selectively retrieve the stored personalized message for playing to 30 a caller on the telephone line. The call handler interface **16** may advantageously be used by a call handler where phrases, such as a company's or firm's name, for example, are necessarily repeated many times throughout the day.

In addition to the call handler interface **16** being applicable to an ACD system **10**, it is also applicable to a standard telephone system, different embodiments of which will now be described with reference to FIGS. 2 and 3. In one embodiment, the telephone system **30** comprises a single key telephone set **32a**, a call handler interface **16** and a telephone headset **18** connected thereto for the call handler's use as illustrated in FIG. 2. The key telephone set **32a** is further connected to a PSTN **20** as will be appreciated by those skilled in the art.

In another embodiment, the telephone system **30'** comprises a plurality of single key telephone sets **32a-32n**, a plurality of respective call handler interfaces **16** and a plurality of respective telephone headsets **18** connected thereto as illustrated in FIG. 3. The plurality of key telephone sets **32a-32n** are further connected to a private branch exchange (PBX) **19** which is also connected to the PSTN **20** as will be appreciated by those skilled in the art.

Turning now additionally to FIGS. 4-6, the call handler interface **16** will now be described in greater detail. The call handler interface **16** includes a portable housing **40**, a telephone line port **42** carried by the housing to be connected to a telephone line, and a telephone headset port **44** carried by the housing to be connected to a telephone headset **18**.

The call handler interface **16** further includes an amplifier **46** connectable between the telephone line port **42** and the telephone headset port **44** for amplifying and coupling signals therebetween. Personalized message storage and retrieval circuitry **48** is carried by the housing **40** and is connected to the

amplifier **46** for permitting a call handler to store at least one message in a voice of the call handler and selectively retrieve the stored personalized message for playing to a caller on the telephone line.

5 The call handler interface **16** advantageously includes both the personalized message storage and retrieval circuitry **48** and the amplifier **46** for the telephone headset **18**. Such circuitry in the past was typically provided in completely separate components, 10 each with its own respective housing, power supply, telephone line and/or telephone headset ports, etc. The call handler interface **16** thus allows the number of discrete system components to be reduced, which allows a call handler to experience less clutter in their 15 working environment, which may include the ACD system **10** or one of the telephone embodiments **30, 30'** illustrated in FIGS. 1-3.

In addition, since the circuitry can share portions, such as power supplies, amplifiers, etc., the 20 call handler interface **16** can be less expensive than the total cost of multiple corresponding discrete components. Moreover, the lower cost call handler interface **16** can be used in many applications, such as conventional receptionist applications where phrases 25 are necessarily repeated many times throughout the day.

The personalized message storage and retrieval circuitry **48** may be of the types as disclosed in U.S. Patent Nos. 4,623,761; 4,697,282; 4,734,930 and RE 35,758, the entire disclosures of which are 30 incorporated herein by reference and are assigned to the assignee of the present invention. Those of skill in the art will readily appreciate the various constructions of such personalized message storage and retrieval circuitry **48** without further explanation.

The call handler interface **16** includes a level control circuit **50** carried by the housing **40** and connected to the amplifier **46** for controlling at least a playback level for a personalized message. The level control circuit **50** matches the playback level to the live call handler so that caller is not aware that a prerecorded message is being played. A volume control **70** is connected to the level control circuit **50**, for example, for permitting the call handler to select a desired playback level, as best illustrated in FIG. 5. In addition, a mute switch **72** may be connected to the amplifier **46** for muting the call handler.

The call handler interface **16** further includes at least one call handler interface switch **52** carried by the housing **40**, and control logic circuitry **54** carried by the housing for controlling the personalized message storage and retrieval circuitry **48** based upon the at least one call handler interface switch **52**.

More particularly, the at least one call handler interface switch **52** comprises a first set of function switches **54a-54n**, and a second set of personalized message selection switches **56a-56n**. Function indicators **58** may also be carried by the housing **40** and associated with the first set of function switches **54a-54n**.

The first set of function switches **54a-54n** may include a record function switch for recording a personalized message, for example. A corresponding indicator **58**, such as an LED, for example, may be used to indicate when a particular function has been selected or activated. Other function switches manual or automatic selection to permit either manual operator

selection of the message to be played or automatic selection of the message to be played. Of course, in some embodiments only manual or automatic circuitry may be included. The details of the circuitry associated with these particular function switches will be readily appreciated by those skilled in the art without further explanation.

Personalized messages that have been recorded are selected by the call handler by selecting one of the personalized message selection switches **56a-56n** corresponding to a desired message. The personalized message storage and retrieval circuitry **48** may also include a connector **74** and a memory device **76** removably mated with the connector, wherein the memory device stores different messages in a voice of the call handler. This allows different call handlers to use the same call handler interface **16** without having to reprogram the personalized messages to be played, or allows the same call handler to use a different call handler interface **16** without also having to reprogram the personalized messages to be played.

An external control port **60** is carried by the housing **40** and is connected to the control logic circuitry **54** for permitting external control of the personalized message storage and retrieval circuitry **48**. External control would allow the call handler to select a personalized message without having to use the second set of personalized message selection switches **56a-56n**.

In addition to the housing **40** carrying a telephone headset port **44**, the housing further includes a telephone handset port **62** that may be connected to the amplifier **46** for permitting connection of a telephone handset thereto. In other words, the call

handler may use either a telephone headset **18** or a telephone handset by selecting at least one selector switch **64** carried by the housing **40** for selectively connecting the telephone headset port **44** or the 5 telephone handset port **62** to the amplifier **46**.

An alternate embodiment of the call handler interface **16'** in accordance with the present invention will now be described with reference to FIG. 6. In this embodiment, a wireless communication link may be 10 established to the telephone headset **18'**. More particularly, a wireless transceiver **80'** (combination transmitter and receiver) may be provided at the headset **18'**, and a corresponding wireless transceiver **82'** is provided within the common housing **40'**. In 15 addition, the telephone handset port **62** may include a wireless transceiver **84'** for establishing a wireless communication link to a telephone handset.

The wireless transceivers **80'**, **82'** and **84'** may be radio frequency or infrared devices, for example, as 20 will be appreciated by those skilled in the art. In addition, although a unidirectional wireless link is illustrated, in other embodiments a bi-directional link may be provided.

A wireless communication link may also be 25 established via the telephone line port **42** to a key telephone set **32a** or an ACD **12**. More particularly, a wireless transceiver **86'** may be provided within the common housing **40'** for communicating with a corresponding transceiver (not shown) in one of these 30 devices, as readily appreciated by those skilled in the art. Other circuit portions not specifically mentioned, but indicated with prime notation, are similar to those described above, and require no further discussion.

Another aspect of the present invention relates to a method for making a call handler interface 16. The method includes providing a housing 40 with a telephone line port 42 and telephone headset port 44 carried by the housing, and providing an amplifier 46 in the housing that is connectable between the telephone line headset port and the telephone headset port for amplifying and coupling signals therebetween. The method also includes providing personalized message storage and retrieval circuitry 48 carried by the housing 40 that is connected to the amplifier 46 for permitting a call handler to store at least one message in a voice of the call handler and selectively retrieve the stored at least one personalized message for playing to a caller on the telephone line.

Many modifications and other embodiments of the invention will come to the mind of one skilled in the art having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. For example, the call handler interface 16 may include a headset carried by the housing 40. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed, and that modifications and embodiments are intended to be included within the scope of the appended claims.